

IN THE CLAIMS:

Claims 1-40 (Canceled)

41. (Currently Amended) An electron beam exposure tool, comprising:

an electron gun including an electron gun assembly, the electron gun for generating an electron beam; and

at least one lens array, placed in a drift space, adjacent to said electron gun, for splitting the electron beam into a plurality of sub beams to control emittance of said electron beam exposure tool, the drift space being a region that, during operation, is substantially free of electric field lines/gradients such that motion of electrons in the electron beam are not altered when the electrons pass through the drift space.

42. (Previously Presented) The electron beam exposure tool of claim 41, wherein said at least one lens array is placed in said electron gun assembly.

43. (Previously Presented) The electron beam exposure tool of claim 41, wherein said at least one lens array is placed in a liner tube, connected to said electron gun assembly.

44. (Previously Presented) The electron beam exposure tool of claim 43, wherein the liner tube and said electron gun are secured vacuum-tight.

45. (Previously Presented) The electron beam exposure tool of claim 43, wherein the liner

tube and said electron gun are bolted together.

46. (Previously Presented) The electron beam exposure tool of claim 43, wherein the liner tube and said electron gun are welded together.

47. (Previously Presented) The electron beam exposure tool of claim 41, said at least one lens array including at least one mesh grid.

48. (Previously Presented) The electron beam exposure tool of claim 41, said at least one lens array including at least two mesh grids.

49. (Previously Presented) The electron beam exposure tool of claim 41, said at least one lens array including at least three mesh grids.

50. (Previously Presented) The electron beam exposure tool of claim 41, said at least one lens array including at least one continuous foil.

51. (Canceled)

52. (Previously Presented) The electron beam exposure tool of claim 41, said at least one lens array having a transparency between 40-90%.

53. (Previously Presented) The electron beam exposure tool of claim 41, wherein said electron beams exposure tool is a SCALPEL tool, modified electron beam exposure system (MEBES) tool, or EBES tool.

54. (Canceled)

55. (Previously Presented) The electron beam exposure tool of claim 41, wherein said lens array increases emittance of an electron beam by producing a divergent beam from an incoming electron beam

56. (Previously Presented) The electron beam exposure tool of claim 47, wherein the emittance of the electron beam is increased by a factor substantially equal to $(L/d)^2$, where

L represents a pitch of said at least one mesh grid, and

d represents a diameter of a beam crossover created by each opening in said at least one mesh grid.

57. (Previously Presented) The electron beam exposure tool of claim 49, wherein said at least one lens array includes an odd number of mesh grids, including two outer mesh grids having a curved shape, and

wherein spherical aberration of an electron beam passing through said at least one lens array is reduced.

58. (Currently Amended) A method of controlling beam emittance, comprising:
supplying an electron beam with an electron gun including an electron assembly; and
splitting the electron beam via at least one lens array placed in a drift space, adjacent to the electron gun, the drift space being a region that, during operation, is substantially free of electric field lines/gradients such that motion of electrons in the electron beam are not altered when the electrons pass through the drift space.

59. (Previously Presented) The method of claim 58, wherein the at least one lens array is placed in the electron gun assembly.

60. (Previously Presented) The method of claim 58, wherein the at least one lens array is placed in a liner tube, connected to said electron gun assembly.

61. (Previously Presented) The method of claim 60, wherein the liner tube and the electron gun are secured vacuum-tight.

62. (Previously Presented) The method of claim 60, wherein the liner tube and the electron gun are bolted together.

63. (Previously Presented) The method of claim 60, wherein the liner tube and the electron gun are welded together.

64. (Previously Presented) The method of claim 58, wherein the at least one lens array includes at least one mesh grid.

65. (Previously Presented) The method of claim 58, wherein the at least one lens array includes at least two mesh grids.

66. (Previously Presented) The method of claim 58, wherein the at least one lens array includes at least three mesh grids.

67. (Previously Presented) The method of claim 58, said at least one lens array including at least one continuous foil.

68. (Canceled)

69. (Previously Presented) The method of claim 58, said at least one lens array having a transparency between 40-90%.

70. (Previously Presented) The method of claim 58, wherein said method is performed by an electron beam exposure tool, including a SCALPEL tool, a modified electron beam exposure system (MEBES) tool, or an EBES tool.